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10/632,273

07/31/2003

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EXAMINER

ISLA RODAS, RICHARD

ART UNIT

PAPER NUMBER

2829

MAIL DATE

DELIVERY MODE

07/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/632,273

Applicant(s)

FARNWORTH ET AL.

Examiner

Richard Isla-Rodas

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-46 and 49-74 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 42-44, 49, 50, 52 and 63-65 is/are allowed.
- 6) ☒ Claim(s) 31-33, 36-39, 41, 45, 46, 51, 53-62, 66, 67, 69, 70, 72 and 73 is/are rejected.
- 7) ☒ Claim(s) 34, 35 and 40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/07 - 4/07

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 4/16/2007 have been fully considered but they are not persuasive.

In response to the argument that Leedy does not teach the "sacrificial substrate" are part of the insertion device (see last 4 lines in page 17 of submitted remarks). The applicant is reminded that Leedy teaches a substrate "14" which is not a sacrificial substrate, but rather a structural layer. It appears the applicant misinterprets the Office Action as stating that Leedy teaches element "44" (sacrificial substrate) as the element relied upon in the Office Action. The remarks that follow from this misinterpretation are considered moot, as the sacrificial substrate was not considered in the rejection of claim 31.

In response to the argument that Asch doesn't teach bulk semiconductive material: The examiner relies on what the applicant's specification admits to be a bulk semiconductive material. The applicant discloses in the specifications (page 7, line 5-12) that bulk substrate 12 is "comprised" of a first material, which constitutes the material of bulk substrate 12. The preferred material is monocrystalline silicon.

Also, the applicant argues in pages 15-17 of the submitted remarks, that the forming of sacrificial substrate 44 is not being equivalent to bulk semiconductor formed from bulk material of an original substrate. Whether the claimed bulk semiconductive material is formed by deposition, etching, molding, or by using material from an original substrate, the method of forming the device is not germane to the issue of patentability

of the device itself as long as the prior art anticipates the structural limitations. A device claim recites what the device is, not what the device does or the manner in which it was manufactured. Claim 31 recites an apparatus with a certain structure and is made of a preferred material. Leedy meets all of the structural limitations of the device, except for the preferred material used for the device's manufacture. Asch however, shows the use of such preferred material is well known in the art and its choice as the preferred material for the structure based on its suitability for the intended use (support) would be an obvious matter of design choice (preferred material).

Claim Objections

2. Claim 53 is objected to because of the following informalities: The claim recites in line 8, "shape relative the projecting apexes...". It appears that the applicant means, "shape relative to the projecting apexes..."

Also, it's not clear whether two elements can have different shapes while keeping the same dimensions as recited in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 68, 71 and 74 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In terms of claims 68, 71 and 74, the claims recite "an engagement probe comprising a projection wherein the material of the projection is bulk semiconductive material wherein the bulk semiconductive material is material of a wafer." The limitation "wafer" is not positively recited and thus, it's not clear what the applicant claims the bulk semiconductive material to be. No mention on the wafer's material, nor the wafer's composition or structure is made. Consequently, it's not possible to determine what the applicant regards to as "material of a wafer".

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 53 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by the US Patent to Leedy (5,323,035).

In terms of claim 53, Leedy anticipates (Figure 2) an engagement probe comprising a substrate (that portion of 14 having its elevation above the level plane of item 12), a projection (that portion of 14 having its elevation below the level plane of item 12) supported over the substrate and comprising material of the substrate and a grouping of a plurality of projecting apexes (10) extending from the projection and positioned in sufficient proximity to one another to collectively engage a single conductive pad on a semiconductor substrate (col 5, ln 39-40), wherein an entirety of

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the projection is spaced from the substrate (that portion of 14 having its elevation below the level plane of item 12) and which has (the projection) the shape of inverted triangles as opposed to rectangles (substrate).

As to claim 56, Leedy shows in Figure 2 an intermediate structure (that portion of 14 between the substrate and the projection, see **Space** in Figure A below), providing spacing of the projection from the substrate comprising a lateral dimension that is different from a lateral dimension of the substrate and a lateral dimension of the projection (they all have different lateral lengths).

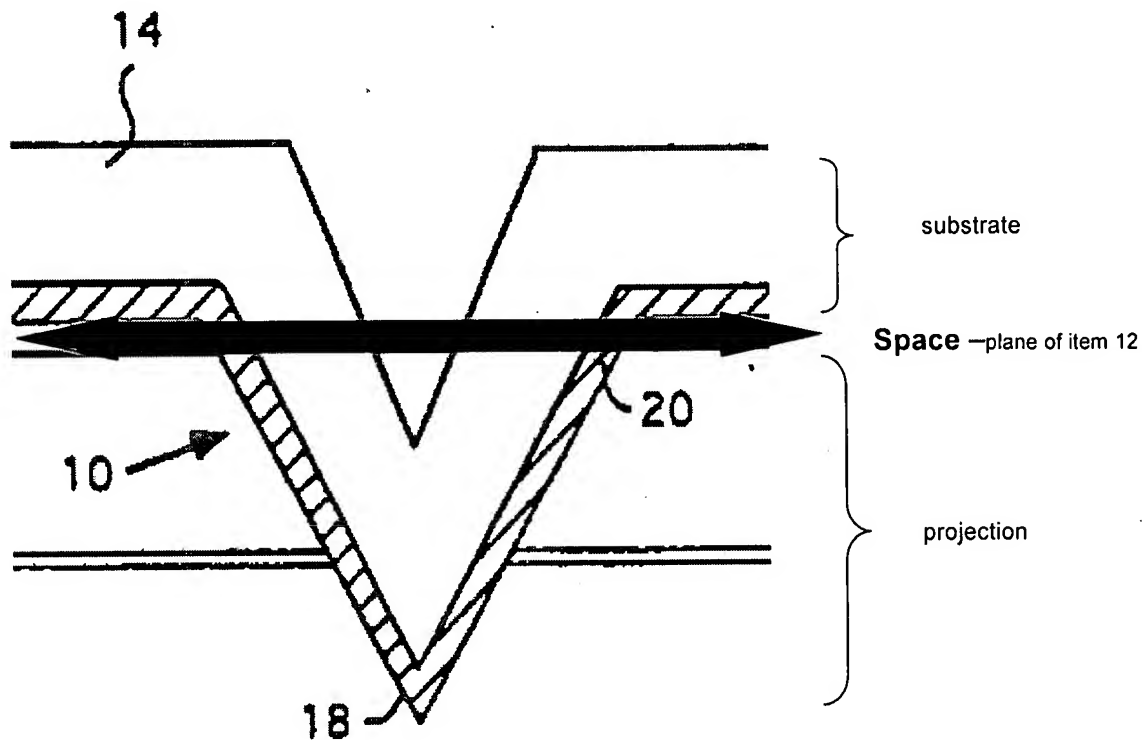


Figure A

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 31-33, 36-39, 41, 45, 46, 51, 54, 55, 57, 60, 58, 59, 61, 62, 66-67, 69-70, 72-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over the US Patent to Leedy (5,323,035) in view of the US Patent to Asch et al. (4,520,314).

In terms of claims 31, Leedy shows in Figure 2, a substrate (14) comprising semi conductive material (dielectric material), a projection (that portion of 14 having its elevation below the level plane of item 12) supported over the substrate and comprising material of the substrate and a grouping of a plurality of projecting apexes (10) extending from the projection. Leedy teaches all of the claimed elements, as recited above, except for the choice of preferred material (bulk semi conductive material) the substrate is made of. Asch et al. Teaches in Figure 1 a probe head arrangement, wherein the probe head (5) is made of one piece of monocrystalline silicon (bulk semi conductive material, as disclosed by the applicant in page 7, lines 8 and 9 of the submitted specification). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use monocrystalline silicon as the preferred material constituting the semi conductive material in Leedy's device, since it has been held to be within the general skill of a worker in the art to select a known material on the

basis of its suitability for the intended use as a matter of obvious design choice. In re Leshi, 125 USPQ 416.

As to claim 32 the added limitation of comprising a plurality of such groupings for engaging multiple conductive pads on the semiconductor substrate (reference made to use of a plurality of insertion structures to make temporary and reliable electrical interconnection to the signal, power and ground contacts of an IC; see col 1, ln 20-31) is anticipated.

As to claim 33 the added limitation of the apexes being in the shape of multiple knife-edge lines is anticipated (having the apexes in this configuration is inherent to the teaching of Leedy because Leedy teach that its insertion structures can be configured in a plurality of arrangements further exemplified by its disclosed embodiments; in Figure 2, each insertion structure can be made with a "blade-like edge" as noted at col 4, ln 22-25).

As to claim 36 the added limitation of the grouping of apexes being formed on the projection that is supported by another projection (either 40 or 42 or both in combination), the another projection extending directly from the substrate is anticipated by Leedy (note this projection is positioned directly from substrate 14).

As to claim 37 the added limitation of the apexes having a selected projecting distance, the projecting distance being about one-half the thickness of the conductive pad which the apparatus is adapted to engage has no effect on the physical and dimensional aspects of the claimed invention that is limited to only an engagement probe and therefore does not further limit the claimed invention according to claim 31.

As to claim 38 the added limitation of the apexes projecting from a common plane (that portion between and on opposite sides of insertion structures 10 having a lateral horizontal surface) of the projection, the apexes having respective tips and bases, the bases of adjacent projecting apexes being spaced from one another to define a penetration stop plane therebetween (base of apexes are those portions of insertion structures 10 supporting its narrowest portion, the pointed tips, and the lateral horizontal surfaces, as noted above, define the penetration stop plane).

As to claim 39 the added limitation of the apexes projecting from a common plane (the upper horizontal border of layer 20) of the projection, the apexes having respective tips and bases of adjacent projecting apexes and being spaced from one another to define a penetration stop plane therebetween (base of apexes are those portions of insertion structures 10 supporting its narrowest portion, the pointed tips, and the lateral horizontal surfaces, as noted above, define the penetration stop plane), the tips being a distance from the penetration stop plane of about one-half the thickness of the conductive pad which the apparatus is adapted to engage. (the italicized features have no effect on the physical and dimensional aspects of the claimed invention that is limited to only an engagement probe and therefore does not further limit the claimed invention according to claim 31).

As to claim 41 the added limitation of the conductive apexes constitute a first electrically conductive material (20), and wherein the conductive pads for which the probe is adapted have outermost portions constituting a second electrically conductive material; the first and second electrically conductive materials being different is

anticipated (multiple choices of conductive materials are disclosed by Leedy [col 3, ln 25-29] and further note reference to dissimilar metals at col 3, ln 40-46).

As to claim 45 the added limitation of the plurality of projecting apexes extending from a substantially planar uppermost surface (that portion between and on opposite sides of insertion structures 10 having a lateral horizontal surface) of the projection is anticipated.

As to claim 46 having an entirety of the projection spaced from the substrate is anticipated by Leedy (that portion of 14 having its elevation below the level plane of item 12).

As to claim 51 and 69, Leedy anticipates (Figure 2) an engagement probe comprising: a substrate (that portion of 14 having its elevation above the level plane of item 12), a projection (that portion of 14 having its elevation below the level plane of item 12) supported over the substrate and comprising material of the substrate; a grouping of a plurality of projecting apexes (10) extending from the projection and positioned in sufficient proximity to one another to collectively engage a single conductive pad on a semiconductor substrate (col 5, ln 39-40); and wherein the grouping of apexes is formed on, the projection which is supported by another projection (either 40 or 42 or both in combination), the another projection extending directly from the substrate (note this projection is positioned directly from substrate 14). Leedy teaches all of the claimed elements, as recited above, except for the choice of preferred material (bulk semi conductive material) the substrate is made of. Asch et al. Teaches in Figure 1 a probe head arrangement, wherein the probe head (5) is made of one piece of monocrystalline

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silicon (bulk semi conductive material, as disclosed by the applicant in page 7, lines 8 and 9 of the submitted specification). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use monocrystalline silicon as the preferred material constituting the semi conductive material in Leedy's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshi, 125 USPQ 416.

As to claim 54, Leedy anticipates (Figure 2) an engagement probe comprising a substrate (that portion of 14 having its elevation above the level plane of item, a projection (that portion of 14 having its elevation below the level plane of item 12) supported over the substrate and comprising material of the substrate and a grouping of a plurality of projecting apexes (10) extending from the projection and positioned in sufficient proximity to one another to collectively engage a single conductive pad on a semiconductor substrate (col 5, ln 39-40) and wherein the substrate comprise semiconductive material. Leedy teaches all of the claimed elements, as recited above, except for the choice of preferred material (bulk semi conductive material) the substrate is made of. Asch et al. Teaches in Figure 1 a probe head arrangement, wherein the probe head (5) is made of one piece of monocrystalline silicon (bulk semi conductive material, as disclosed by the applicant in page 7, lines 8 and 9 of the submitted specification). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use monocrystalline silicon as the preferred material constituting the semi conductive material in Leedy's device, since it has been held to be

within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshi, 125 USPQ 416.

As to claim 55, Leedy shows in Figure 2 an intermediate structure (that portion of 14 between the substrate and the projection, see **Space** in Figure A above), providing spacing of the projection from the substrate comprising a lateral dimension that is different from a lateral dimension of the substrate and a lateral dimension of the projection (they all have different lateral lengths).

As to claim 57 and 60, Leedy shows in Figure 2, teaches in Figure 1b, the projection comprises a lateral dimension (lacking a description in the claim of where the "lateral dimension" is measured to and from, the "lateral dimension" is taken as the lateral length of penetration) less than a lateral dimension of the substrate. Furthermore, a modification of prior art that involve a mere change in the size of a component is generally recognized as being within the level of ordinary skill in the art. In Rose, 105 USPQ 237 (CCPA 1955).

As to claim 58, Leedy teaches all of the claimed elements as discussed above, except for the choice of preferred material (bulk silicon) the apexes are made of. Asch et al. Teaches in Figure 1 a probe head arrangement, wherein the probe head (5) is made of one piece of monocrystalline silicon (bulk semi conductive material, as disclosed by the applicant in page 7, lines 8 and 9 of the submitted specification). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use monocrystalline silicon as the preferred material constituting

the semi conductive material in Leedy's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshi, 125 USPQ 416. Furthermore, monocrystalline silicon is a bulk semiconductor as disclosed by applicant in page 7 lines 8-9 of the submitted specification. Monocrystalline silicon is made of silicon so inherently; Monocrystalline silicon is bulk silicon.

As to claim 59, Leedy shows in Figure 2 an intermediate structure (that portion of 14 between the substrate and the projection, see **Space** in Figure A), providing spacing of the projection from the substrate comprising a lateral dimension that is different from a lateral dimension of the substrate and a lateral dimension of the projection (they all have different lateral lengths).

As to claim 61, as stated with regards to claim 31, Leedy teaches a substrate (14) comprising semiconductive material. A wafer is a piece of semiconducting material.

As to claim 62, as stated with regards to claim 31, Leedy in view of Asch et al. teach a substrate (14) comprising monocrystalline silicon. Monocrystalline silicon is a bulk semiconductor as disclosed by applicant in page 7 lines 8-9 of the submitted specification. Monocrystalline silicon is made of silicon so inherently; Monocrystalline silicon is bulk silicon.

As to claims 66-67, 69-70 and 72-73, Leedy teaches the substrate 14, projection (that portion of 14 having its elevation below the level plane of item 12) and apex (10) comprises semiconductive material. As explained with regards to claim 33, it would

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have been obvious to one of ordinary skill in the art to use bulk semiconductive material (monocrystalline silicon) as the preferred material for those elements.

Allowable Subject Matter

9. Claims 34, 35, and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In terms of claim 34, the prior art of record does not teach alone or in combination an engagement probe comprising a grouping of a plurality of projecting apexes having the shape of knife-edge lines wherein the multiple knife-edge lines are positioned to form at least one polygon, in combination with all other elements in claim 31.

In terms of claim 35, the prior art of record does not teach alone or in combination an engagement probe comprising a grouping of a plurality of projecting apexes having the shape of knife-edge lines wherein the multiple knife-edge lines are positioned to form at least two polygons one of which is received entirely within the other, in combination with all other elements in claim 31.

In terms of claim 40, the prior art of record does not teach alone or in combination an engagement probe comprising a grouping of a plurality of projecting apexes having the shape of knife-edge lines, the multiple knife-edge lines interconnecting to form at least one fully enclosed polygon, in combination with all other elements in claim 31.

10. Claims 42-44, 49-50, 52, 63- 65 are allowed.

In terms of claim 42, the prior art of record does not teach alone or in combination an engagement probe having a grouping of apexes wherein the apexes are in the shape of multiple knife-edge lines being positioned to form at least one polygon, in combination with all other elements in claim 42.

In terms of claim 43 and 49, the prior art of record does not teach alone or in combination an engagement probe having a grouping of apexes wherein the apexes are in the shape of multiple knife-edge lines being positioned to form at least two polygons one of which is received entirely within the other, in combination with all other elements in claims 43 and 49 respectively.

In terms of claim 44, the prior art of record does not teach alone or in combination an engagement probe having a grouping of apexes wherein the apexes are in the shape of multiple knife-edge lines being interconnecting to form at least one fully enclosed polygon, in combination with all other elements in claim 44.

In terms of claim 50, the prior art of record does not teach alone or in combination an engagement probe comprising a substrate having a grouping of apexes wherein the apexes are formed on a projection which is supported by another projection, the another projection extending directly from the side of the substrate in combination with all other elements in claim 50.

In terms of claim 52, the prior art of record does not teach alone or in combination an engagement probe comprising a substrate having a grouping of apexes wherein the apexes are formed on a projection which is supported by another

projection, the another projection comprising material of the substrate in combination with all other elements in claim 52.

As to claim 63, the prior art of record does not teach alone or in combination an engagement probe comprising a grouping of a plurality of projecting apexes having the shape of knife-edge lines wherein the multiple knife-edge lines are positioned to form at least one polygon, in combination with all other elements in claim 63.

As to claims 64-65, the claims are allowable as they contain structure that further limits allowed claim 63.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Isla-Rodas whose telephone number is (571) 272-5056. The examiner can normally be reached on Monday through Friday 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Richard Isla-Rodas
July 7, 2007


ERNEST KARLSEN
PRIMARY EXAMINER